



ARISTOTLE
UNIVERSITY
OF THESSALONIKI

PRACTICE ABSTRACT N°10

Intercropping of wheat and pea can suppress weed growth and enhances water use efficiency under Mediterranean conditions

Problem

Weed management in agriculture is an important issue and relies on the use of synthetic herbicides which have detrimental environmental & health impacts.

Solution

Use of intercropping with different crop species and high density, can suppress the development of weeds and so, improve the weed management in a sustainable way (Gu et al., 2021), as well as enhance the water use efficiency (Pankou et al., 2021).

Benefits

Intercropping can reduce the growth of weeds, achieve higher yields (Gu et al., 2021), increase water use efficiency and improve the sustainability of the cropping systems (Figures 1-3, Table 1).

Applicability box

Theme

Cropping systems, Arable crops, Weed management.

Keywords

Low input agriculture, Cereal crops, Legumes, Weed control, Annual weeds.

Context

Temperate areas, Mediterranean climate.

Application time

Autumn crops.

Required time, if relevant

No additional time during cultivation. The harvested crop needs to be separated at a collection point.

Period of impact, if relevant

Duration of the crop.

Equipment

Standard machinery used for wheat cultivation.

Best in

Winter cereals and legumes and especially in rainfed agricultural systems.

Practical recommendations

- Seed bed preparation
 - Seed bed should not be too fine-grained after cultivation.
- Varieties
 - Select cultivars (wheat and grain legume) with the same maturity time taking the local seed costs and availability on the market into account
- Sowing densities, machinery
 - Mix the seeds 75% grain legume and 25% wheat (compared to the standard crop density of both crops) in the seed tank, check that the mixture is homogenous and sow with a conventional seeder.
 - Use same row spacing as for cereals.
 - Matching seed depth and homogeneity of the mixture should be checked.
- Weed control
 - Mixtures with different crop species gave even better weed suppression (Figure 1).
- Harvest
 - Adjust height of harvester to pick up grain legumes close to ground



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- Other recommendations
 - Separate a part of your field before sowing and apply the mixture.
 - Cultivate the rest of the field as usual and compare the intercrop to the sole cereals and /or legumes.
 - We recommend that you test this method under your own farm conditions. You can communicate your experience with us as well as with other farmers, advisors, and scientists.

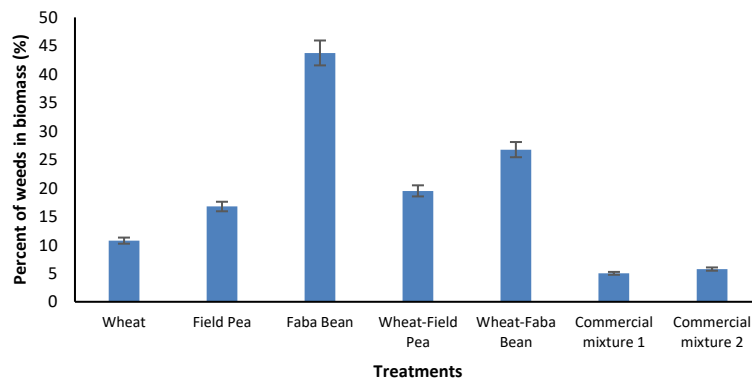


Figure 1. Effect of intercropping and increased in biodiversity on reducing the weed pressure where commercial mixture 1 (20% soft wheat, 10% oat, 35% triticale, 15% field pea and 20% common vetch) and commercial mixture 2 (30% soft wheat, 10% oat, 20% triticale, 15% field pea and 25% common vetch).

Table 1. Water use efficiency of the different mixtures and monocrops under rainfed and irrigated conditions

	Wheat (kg/ha/mm)		Pea (kg/ha/mm)		Intercrop (kg/ha/mm)			
	Yecora E	Elissavet	Isard	Olympos	Yecora E-Isard	Yecora E-Olympos	Elissavet-Isard	Elissavet-Olympos
Irrigated	12.23	11.82	9.16	3.82	13.19	7.64	12.37	5.50
Rainfed	13.47	12.81	7.11	5.00	10.27	8.55	11.84	6.90
Average	12.85	12.32	8.14	4.41	11.73	8.10	12.11	6.20

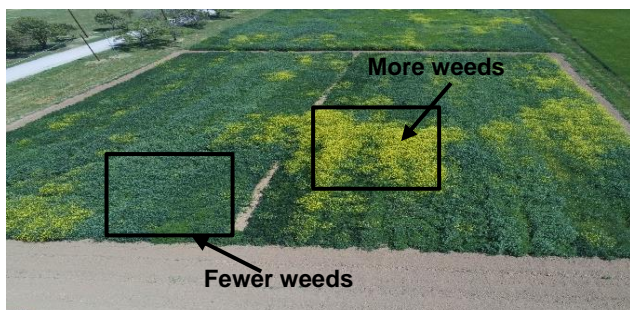


Figure 2. Mixture of different intercropping systems where in some areas there is high weed pressure and in other very low.

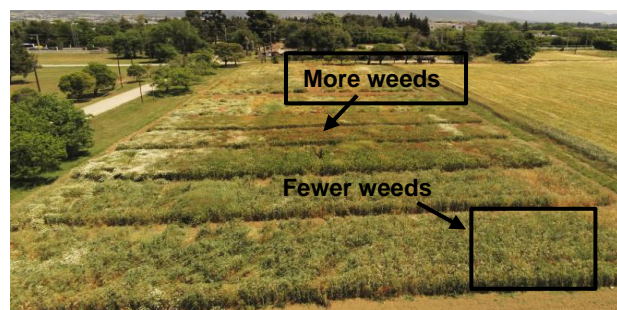


Figure 3. Mixture of different species in intercropping systems where in some areas there is high weed pressure and in other very low.



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Further information

Further readings

- Gu, C., Bastiaans, L., Anten, N. P., Makowski, D., & van der Werf, W. (2021). Annual intercropping suppresses weeds: A meta-analysis. *Agriculture, Ecosystems & Environment*, 322, 107658.
- Pankou, C., Lithourgidis, A., Dordas, C. (2021) Effect of Irrigation on Intercropping Systems of Wheat (*Triticum aestivum* L.) with Pea (*Pisum sativum* L.). *Agronomy* 11, 283.

Weblinks

- intercropvalues.eu

About this practice abstract

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IntercropVALUES aims to exploit the benefits of intercropping to design and manage productive, diversified, resilient, profitable, environmentally friendly cropping systems acceptable to farmers and actors in the agri-food chain. As a multi-disciplinary and multi-actor project, it brings together scientists and local actors representing the food value chain. It includes 27 participants from 15 countries (3 continents) from a wide diversity of organizations and stakeholders. The project will run for four years and started in November 2022.

Project website: <https://intercropvalues.eu/>

